

**Listing of Changes to Specification:**

**ABSTRACT**

An investment portfolio management method and system. The method is developed using mathematical models and implemented via the Intra- and Internet technology. The method is a comprehensive portfolio management model applicable to developing personal financial planning or retirement planning models, managing separate brokerage accounts, constructing and monitoring mutual and/or hedge funds. ~~[[personal financial planning business model.]]~~ With this method a conventional mean-variance efficient portfolio frontier analysis, which is often cited in Modern Portfolio Theory (MPT), one of the major scholarly developments in modern finance, finds its way into actual securities trading and rebalancing in real world. MPT is modified to allow various transactions costs, e.g. bid/ask spread, brokerage commissions, taxes, and others; as well as non-stationary securities return distributions to form efficient portfolios in real time by way of various portfolio rebalancing strategies. The system offers an automatic, mathematical solution for asset allocation and cash management in real time, while managing and trading on portfolios of each asset class, e.g. commercial papers, repurchase agreements, money market funds, bonds, stocks, mutual funds, and other derivatives on an auto mode.

**Page 2, Line 24**

The current specification displays broken characters in equation (1). The corrected equation is:

$$R_i = \alpha_i + \sum_{j=1}^k \beta_{ij} F_j + \varepsilon_i \quad (1)$$

**Page 2, Line 25**

Line 25 should read as follows.

" $F_j$  is an investment style economic factor,  $j, \dots$ "

Page 2, Line 26

This particular Line 26 was misprinted due to special Greek symbols used. It should read

"...affecting all security returns;  $\alpha_i$  is a regression constant;  $\beta_{ij}$  is the [[a]] sensitivity ..."

Page 3, Line 2

The following is inserted in Line 2.

" economic growth rates, interest rates, price-earnings, firm size, market to book value, and so forth."

Page 3, Line 3

This particular Line 3 also shown broken characters and should read as follows.

"Since an investment portfolio return is defined as  $R_p = \sum_{i=1}^n X_i R_i, \dots$ "

Page 3, Lines 7 and 8

The following two equations should also read

$$\underline{E[R_p] = \sum_{i=1}^n X_i E[R_i]}, \text{ and} \quad (2)$$

$$\underline{\sigma_p^2 = \sum_{i=1}^n X_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{\substack{j=1 \\ j \neq i}}^n X_i X_j \sigma_{ij}} \quad (3)$$

Page 3, Line 10

The Greek symbol used in Line 10 should read correctly as,

“... and minimizing the portfolio’s risk,  $\sigma_p^2$ , have been well documented in many ...”

Page 4, Line 1

Line 1 should insert the following.

“... In addition, as of the date when this application is filed, there has been no known computational ....”

Page 10, Line 3

Line 3 should insert the following.

“ investments in general for all financial advisors, hedge fund managers, mutual fund and other retirement plan managers, providing various analytical tools, ...”

Page 10, Line 6

Line 6 should insert the following.

“ provides investors and all professional investment managers with a complete integrated ...”

Page 10, Line 19

Line 19 should read as follows.

“the [[market benchmark,  $R_m$ ,]] investor-specified particular investment style fund,  $R_{Im}$ , an optimal allocation ...”

Page 10, Line 21

Currently, a mathematical equation in Line 21 is shown incomplete due to special Greek characters used. The correct equation should read

$$\underline{R_T = \omega R_c + (1 - \omega) R_I}$$

Page 10, Lines 26 through 28

Line 26 should insert the following.

"cash account and  $R_I$  is the rate of return on a particular investment style portfolio of risky assets. Under Modern Portfolio Theory (MPT), if the expected return on market portfolio is  $R_m$ , and  $\beta_I$  is the beta risk of portfolio  $I$ ,  $R_T$   $\{[R_I]\}$  can be further defined as

$$\underline{R_T = R_c + (R_m - R_c)\beta_I}$$

Page 11, Line 4

The following sentence should be inserted.

"the case of MPT. To be more specific, the market portfolio is viewed as an optimal portfolio of various investment style funds. This return on the market benchmark"

Page 11, Line 8

The equation as shown in Line 8 did not turn out correct due to special Greek characters used. It should read

$$\underline{R_I = \phi R_b + (1 - \phi) R_s}$$

Page 11, Lines 9 through 12

Lines 9 through 12 should be replaced with the following.

~~"[The expected return on a risky portfolio,  $R_I$ , will be computed by maximizing an objective function,  $(R_I - R_c)/\sigma_I$ , with respect to  $\phi$ 's, proportion in which bonds and stock portfolios are combined to form an optimal asset allocation. The symbol  $\sigma_I$  is the standard deviation of the portfolio's return.]~~ The expected return on a particular investment style fund,  $R_I$ , will be computed by a portfolio weight, which maximizes an objective function  $(R_I - R_c)/\sigma_I$ . The symbol  $\sigma_I$  is the standard deviation of the portfolio's return. The expected return on a stock portfolio can also be computed similarly by maximizing an objective function  $(R_s - R_c)/\sigma_s$ ."

Page 11, Lines 13 and 14

The sentence in Lines 13 and 14 should read,

"Alternatively, expected returns and the standard deviation on a bond and stock portfolio can ~~[[will]]~~ be determined separately."

Page 11, Line 28

The equation should read as follows.

$$\underline{\beta_I = \phi\beta_b + (1 - \phi)\beta_s}$$

Page 12, Line 14

Line 14 is corrected to include the following.

"..... a peculiar various style-based market index ..."

Page 12, Line 22

Line 22 should read

“... (See the point denoted by *e* [[E]] in Figure 2). ...”

Page 13, Lines 1 through 6

To be deleted from the specification. That is,

~~[[A personal financial planning worksheet can be constructed by TPS based on the investor's initial and future regular investments showing possible and/or desirable future investment returns from each investment. The worksheet can be readjusted by the investor along with portfolio rebalances using TPS in regular time intervals, e.g., every day, every month, or every 3 months, etc.]]~~

Page 13, Line 16

The following should be inserted.

“Jones, or any other investment style index returns, etc. Once the initial ...”

Page 13, Lines 27 and 28

Lines 27 and 28 should be corrected as follows.

“ prices follow various stochastic diffusion random walk processes, the present invention recognizes fractality in securities returns and dynamically changes distribution parameters ...”

Page 21, Line 3

The following should be inserted for clarity.

“present invention (henceforth referred to as Tara Portfolio Solutions or TPS) is implemented in a modern ...”

**Drawing Amendments:**

**Figure 1:** Client computer number is changed from 12 to 10.

**Figure 2:** A more illustrative drawing is introduced. The current invention specifies a manner in which one can construct his or her own customized portfolio on demand. The procedure is as follows.

1. Screen all securities that fall in the category of a particular investment style or risk factor, e.g. growth, or value, emerging market, or bio-tech, etc.
2. Compute the expected return and beta risk of all securities, which fall in the above category.
3. Take the ratio of the expected return premium relative to beta risk, and rank securities in a descending order.
4. Construct a scenario portfolio of the first best security and compute the portfolios expected return premium over the portfolio's volatility risk (the portfolios return-risk index).
5. Next, construct another scenario portfolio, at this time, of the first two best securities. And compute the portfolios return-risk index and compare it to that in Step 4. If the portfolios return-risk index increases, include both in the portfolio.
6. Repeat the Step 5, but at this time, for a scenario portfolio of the first three best securities. If the portfolios return-risk index increases, include all three in the portfolio.
7. This process continues until the portfolios return-risk index starts falls.
8. The optimal portfolio weight is determined by the relative percentage contribution of each security to the portfolios return-risk index.

The newly revised Figure 2 reflects these above procedures in detail.

**Figures 3 to 9:** The original drawings are out of proportion.